

THE INVENTION CLAIMED IS:

1. An electronic lock box apparatus having a holding member attachable to a fixed object, said electronic lock box apparatus comprising:

5 an electrical power source, a controller circuit, a secure compartment having an access member actuated by a first movable latch member, a holding member actuated by a second movable latch member, a prime mover device, and a linear actuator;

wherein:

10 said controller circuit is configured to move said linear actuator in a first substantially linear direction by way of said prime mover device to thereby cause said access member to be released, thereby allowing access to said secure compartment; and

15 said controller circuit is also configured to move said linear actuator by way of said prime mover device in a second substantially linear direction that is substantially opposite of said first direction, to thereby cause said holding member to be released, thus allowing said electronic lock box apparatus to be detached from a fixed object.

2. The electronic lock box apparatus as recited in claim 1, wherein:

(a) said prime mover device comprises an electric motor with a spur gear attached to an output shaft of said motor;

20 (b) said linear actuator exhibits a plurality of teeth that mate with said spur gear; and

(c) when said motor rotates in one of a clockwise or counterclockwise direction, said linear actuator is propelled in said first direction, and when said motor rotates in the opposite of said clockwise or counterclockwise direction, said linear actuator is propelled in said second direction.

25 3. The electronic lock box apparatus as recited in claim 1, wherein: said secure compartment comprises an internal compartment for holding an object, and said access member comprises a movable door that opens to expose an interior portion of said internal compartment and thereby allow access to said object.

30 4. The electronic lock box apparatus as recited in claim 1, wherein:

(a) said holding member comprises a shackle having at least one extension member attachable to and detachable from an opening of said lock box apparatus;

(b) when detached, said shackle is placed around at least a portion of said fixed object, and said at least one extension member is placed into said opening, thereby attaching
5 said lock box apparatus to said fixed object; and

(c) said shackle being released by movement of said linear actuator in the second direction, and said at least one extension member being removable from said opening, thereby allowing said lock box to be detached from said fixed object.

10 5. The electronic lock box apparatus as recited in claim 1, further comprising a position sensor that detects at least one position of said linear actuator.

6. The electronic lock box apparatus as recited in claim 5, wherein said position
15 sensor comprises a variable output device that provides feedback information for a position of said linear actuator to said controller circuit, thereby allowing said controller to more closely control a speed of said prime mover device.

7. The electronic lock box apparatus as recited in claim 5, wherein said position
20 sensor comprises at least one binary sensing device that provides substantially on/off data to said controller circuit.

8. The electronic lock box apparatus as recited in claim 3, wherein:

(a) said movable door is held in a closed position by said first movable latch member that is placed in a first position by said linear actuator when said linear actuator is positioned
25 at a neutral location; and

(b) said movable door is released into an open position by said first movable latch member that is moved to a second position by said linear actuator when said linear actuator is moved a predetermined distance in said first direction.

30 9. The electronic lock box apparatus as recited in claim 8, wherein: said first movable latch member is spring-loaded so as to quickly move into its second position, thereby quickly pushing said movable door open.

10. The electronic lock box apparatus as recited in claim 3, wherein said internal compartment is of a size and shape to contain a mechanical key, when said movable door is in its closed position.

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11. The electronic lock box apparatus as recited in claim 3, wherein:

(a) said linear actuator exhibits a wedge-shaped protrusion that is in mechanical communication with a movable latch cam member, and said movable latch cam member is in mechanical communication with said second movable latch member;

10 (b) said second movable latch member exhibits at least one extending portion having a latching surface;

(c) said at least one extension member of the shackle exhibits at least one latching slot;

15 (d) when said linear actuator is positioned at a neutral location, said movable latch cam member is placed in a first non-actuated position, said second movable latch member is placed in a second non-actuated position, and said at least one extending portion is placed in a third non-actuated position such that its latching surface holds against said at least one latching slot of the at least one extension member of the shackle, thereby holding said at least one extension member within at least one interior guide space of said electronic lock box and thus retaining said shackle to said electronic lock box; and

20 (e) when said linear actuator moves in said second direction, said movable latch cam member is moved toward a fourth actuated position, said second movable latch member is moved into a fifth actuated position, and said at least one extending portion is moved into a sixth actuated position such that its latching surface is moved out of mechanical contact with
25 said at least one latching slot of the at least one extension member of the shackle, thereby releasing said at least one extension member from being confined within said at least one interior guide space of said electronic lock box, and thus allowing said shackle to be released from said electronic lock box.

30 12. The electronic lock box apparatus as recited in claim 11, wherein: said linear actuator moves substantially in a straight line when moving along said second direction from its neutral location; said second movable latch member pivots about an axis when moving

between its second non-actuated position and its fifth actuated position; and said at least one extension member of the shackle moves substantially in a straight line along said at least one interior guide space while being released from said electronic lock box.

5 13. An electronic lock box apparatus having a holding member attachable to a fixed object, said electronic lock box apparatus comprising:

 an electrical power source, a controller circuit, a secure compartment having an access member actuated by a first latch member, a holding member actuated by a second latch member, an electric motor, a movable actuator member that is in mechanical communication
10 with said electric motor, and a position sensing device;

 wherein:

 said controller circuit is configured to attempt to move said actuator member in one of a first direction and a second direction by energizing said electric motor;

 said position sensing device provides substantially continuous position feedback
15 information corresponding to an actual position of said actuator member;

 as said controller circuit attempts to move said actuator member, said position feedback is received by said controller circuit, which determines whether the actuator member is moving according to a predetermined movement pattern over at least one
20 predetermined time interval;

 if the actuator member is moving according to a predetermined movement pattern over at least one predetermined time interval, said controller circuit allows said electric motor to be energized until the actuator member has reached a predetermined position; and

 if the actuator member is not moving according to a predetermined movement pattern over at least one predetermined time interval, said controller circuit terminates energizing
25 said electric motor, regardless of an actual position of said actuator member.

 14. The electronic lock box apparatus as recited in claim 13, wherein:

 (a) said position sensing device comprises a potentiometer that is coupled to a movable lever, which in turn, is coupled to said actuator member; and

 (b) said controller circuit comprises a processing circuit and an analog-to-digital converter circuit that receives an analog voltage signal from a wiper of said potentiometer, which is indicative of a physical position of the actuator member.
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15. The electronic lock box apparatus as recited in claim 13, wherein: said position feedback is sampled over a plurality of predetermined time periods, and said predetermined movement pattern comprises a plurality of position versus time criteria, within a predetermined tolerance.

16. The electronic lock box apparatus as recited in claim 15, further comprising: an ambient temperature sensor; and

wherein: (a) said electrical power source comprises a battery that outputs a battery voltage; (b) said plurality of predetermined time periods are adjusted according to at least one of: (i) an ambient temperature as determined by said ambient temperature sensor, and (ii) said battery output voltage.

17. The electronic lock box apparatus as recited in claim 13, wherein: if the actuator member is not moving according to a predetermined movement pattern over at least one predetermined time interval, after said controller circuit first terminates energizing said electric motor, then said controller circuit energizes said electric motor in an opposite direction in an attempt to unjam said actuator member.

18. The electronic lock box apparatus as recited in claim 13, wherein, when said controller circuit energizes said electric motor in an opposite direction, the controller attempts to move said actuator member back to its starting position.

19. An electronic lock box apparatus having a holding member attachable to a fixed object, said electronic lock box apparatus comprising:

an electrical power source, a controller circuit, a secure compartment having an access member actuated by a first movable latch member, a holding member actuated by a second movable latch member, an electric motor, a movable actuator member that is in mechanical communication with said electric motor, and at least one position sensing device;

wherein:

said controller circuit is configured to energize said electric motor and thus move said actuator member in a first direction until said at least one position sensing device determines

that said actuator member has moved a sufficient distance that causes said first movable latch member to release said access member, thereby allowing access to said secure compartment; and

said controller circuit is configured to energize said electric motor and thus move said actuator member in a second, substantially opposite direction until said at least one position sensing device determines that said actuator member has moved a sufficient distance that causes said second movable latch member to release said holding member, thereby allowing said electronic lock box apparatus to be detached from a fixed object.

20. The electronic lock box apparatus as recited in claim 19, wherein:

(a) said secure compartment comprises an internal compartment for holding an object, and said access member comprises a movable door that opens to expose an interior portion of said internal compartment and thereby allow access to said object;

(b) said movable door is held in a closed position by said first movable latch member that is placed in a first position by said actuator member when said actuator member is positioned at a neutral location; and

(c) said movable door is released into an open position by said first movable latch member that is moved to a second position by said actuator member when said actuator member is moved a predetermined distance in said first direction.

21. The electronic lock box apparatus as recited in claim 20, wherein: said first movable latch member is spring-loaded so as to quickly move into its second position, thereby quickly pushing said movable door open.

22. The electronic lock box apparatus as recited in claim 19, wherein:

(a) said holding member comprises a shackle having at least one extension member attachable to and detachable from an opening of said lock box apparatus;

(b) when detached, said shackle is placed around at least a portion of said fixed object, and said at least one extension member is placed into said opening, thereby attaching said lock box apparatus to said fixed object; and

(c) said shackle being released by movement of said actuator member when said actuator member is moved a predetermined distance in said second direction, and said at least

one extension member being removable from said opening, thereby allowing said lock box to be detached from said fixed object.

23. The electronic lock box apparatus as recited in claim 19, wherein:

5 said at least one position sensing device provides position substantially continuous feedback information corresponding to variations in an actual position of said actuator member;

10 if the actuator member is moving according to a predetermined movement pattern over at least one predetermined time interval, said controller circuit allows said electric motor to be energized until the actuator member has reached a predetermined position; and

 if the actuator member is not moving according to a predetermined movement pattern over at least one predetermined time interval, said controller circuit terminates energizing said electric motor, regardless of an actual position of said actuator member.

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